THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Continued Use Of Costly, Outmoded Computers In Federal Agencies Can Be Avoided

Many Federal agencies' computers today are not up to date. If this outmoded equipment were replaced with modern computers that are more effective, efficient, and economical and that could improve processing capabilities, costly operations would be avoided.

The Office of Management and Budget and the General Services Administration are the key agencies that should jointly instigate procedures for removal of outmoded computers and replacement with modern systems.

Agency heads should evaluate their present and future ADP requirements, plan short and long range procurement strategies, and improve their ADP resource management.

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COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

CONTINUED USE OF COSTLY, OUTMODED COMPUTERS IN FEDERAL AGENCIES CAN BE AVOIDED

D I G E S T

Computers in the Federal inventory are out of date, with only 2 percent of the large- and medium-scale computers using 1975 or later technology. Much of this equipment uses 1971 or earlier technology. Newer equipment of similar capacity could (1) use existing software without significant changes, (2) provide such benefits as faster speeds, better reliability, greater capabilities, lower energy consumption, and (3) avoid costly operations.

A variety of causes have created the current situation. Agencies have not recognized the costs and problems of continuing to use outmoded equipment. Annual savings of $1.4 million are attainable by replacing older equipment just at the four Federal installations GAO reviewed. (See pp. 8 - 9.) Hundreds of other Federal installations have similar, old equipment. The guidance called for in OMB's Circular A-71 for replacing outmoded equipment is needed to assist Federal managers' implementation of current technology, but such guidance has not been issued.

More and better knowledge of computer technology would enable Federal managers to better recognize and evaluate available economical alternatives. Effectively addressing management shortfalls will improve the use of Federal ADP resources and will work toward dissolving the credibility gaps that exist among agency top management, the Congress, and those responsible for the overall management of Federal data processing. The current murky acquisition cycle, which is long, complicated, and frustrating, has contributed to the obsolescence of Federal computers.

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RECOMMENDATIONS

Where replacement of obsolescent equipment now can result in savings, GAO is recommending that the General Services Administration (GSA) (1) issue guidance to agencies outlining the criteria to be used and the cost comparisons to be made in determining outmoded equipment and (2) set forth procedures for expeditiously replacing that equipment. GAO suggests that GSA and the Office of Management and Budget (OMB), acting in concert, require that

--replacement systems obtained on this basis be approximately the same relative compute power as the old systems;

--replacement computers use existing software (including, where possible, plug compatible or emulation processors);

--agencies commit themselves to periodic reporting to OMB and GSA on progress toward (a) replacing obsolescent software with standard high order languages, (b) implementing other Federal ADP standards, and (c) assessing the agency's mission and analyzing how ADP can best help; and

--the internal audit group verify the cost calculations. (See pp. 34 - 35.)

To minimize the possibility of outmoded equipment becoming a recurring problem in the future, GAO is also recommending that GSA develop and issue the guidance and criteria called for in Circular A-71. These would help ensure that, over the long term, Federal computers are continually economical and efficient. (See p. 34.)

Since issuing these guidelines will take time, GAO is also recommending that Federal agencies determine immediately if their systems are economically outmoded by using the same criteria and restrictions as the replacements in GAO's illustrations. (See app. I.) If the equipment is found to be outmoded, then it should be replaced as quickly as possible. (See p. 34.)

To improve the management of ADP resources generally, GAO is recommending that OMB require Federal agencies to

--assess their ADP requirements for the 1980s and plar appropriate short and long range procurement strategies,

--institute a program to improve top managers' knowledge of current computer technologies and concepts,

--increase top management involvement in the acquisition and resource allocation processes, and

--ensure that ADP cost-accounting procedures reflect the principles of full costing and total system-life-cycle costing. (See p. 35.)

AGENCY COMMENTS

Both OMB and GSA acknowledged that the subject of ADP obsolescence is a matter of great concern. OMB commented that this report will be a valuable catalyst in solving this computer problem and GSA agreed that hidden costs of using older computer systems should be included in agency planning and in equipment selections.

Both agencies provided a number of observations for GAO's consideration. The more significant of these--which are dealt with in the body of the report--relate to such topics as questions of noncompetitive procurements and the need for guidelines. (See pp. 35 - 37.)

CHAPTER 1

INTRODUCTION

Many observers have stated that the Federal computer inventory is outmoded. In 1979, the President's Reorganization Project on Automatic Data Processing (ADP) reported that the Government's information technology used outdated methods and equipment. In 1978 the Survey and Investigations Staff of the House Committee on Appropriations commented unfavorably on the age and capabilities of the Government's computers. The private sector, through trade journals and data processing business leaders' comments, has made similar statements. The Federal Government was once considered a pioneer in computer use, but in previous studies we have observed that many installations are using obsolescent equipment. (See app. II.) Today, many Federal computers are models which have been out of production for as long as 10 years. Most of the medium- and large-scale computers Federal agencies use today were first available in the 1960s and early 1970s. Thus, Federal ADP managers are using equipment which is two or more production cycles behind current technology.

COMPUTER TECHNOLOGICAL GAINS ARE SUBSTANTIAL

The computer industry is about 30 years old. Its life to date has been characterized by continuous improvements in performance and dramatic price reductions. As technology allows the development of more powerful computers, users are demanding even more powerful computers to help solve energy, environmental, and military problems. As technology reduces the size and cost of computers, society is finding more uses for the computer in the home, in business, in industry, and in government. In 1950 there were seven computers in the United States; today there are over a million. The number has grown because technology has been able to provide, in an inflationary era, a better product at sharply reduced prices.

ENIAC 1/, the first electronic computer, was installed in 1946. It cost $400,000 and could perform 5,000 additions per second. Its capital cost was $80 per addition per second of capability. One of the most powerful scientific computers currently available is 4,000 times more efficient than ENIAC.

1/Electronic Numerical Integrator and Computer.

It has a capital cost of 2 cents per addition per second and can perform 800 million additions per second. In every performance area--cost, physical size, electrical consumption, compute speed, reliability, maintainability, and ease-of-use--today's computers are far better than those of 25, 10, or even 5 years ago. In this environment of rapid progress, users wedded or restricted to old equipment are failing to harvest the fruits of technological progress.

Responding to the needs of the day, the computer industry now offers a wide range of products--from the affordable small, general business computers to large, complex, distributed processing systems. The microprocessor has affected our personal lives as well as the business environment. Automobiles, appliances, games, and toys are now computerized. Microprocessors are small, inexpensive, and highly reliable. As stand-alone computers they are appropriate for monitoring scientific experiments and energy consumption. They are also being integrated into large computer systems, frequently as a controller or linking unit between a central processor and peripherals--such as magnetic disk memory units, printers, and terminals.

Developments in office automation provide a good example of the capabilities of current computer technology. Office automation should accelerate as personnel costs increase and new technology information storage, processing, and communication costs decline. Recent and emerging technological innovations have led to predictions that office automation trends will merge to form an entirely new office environment. Office systems, data processing, and telecommunications technologies will merge into one. Computing, word processing, and document creation, copying, and transfer will be the functions of a single piece of hardware. Bridging the gap between the technology represented by the Government's current computer inventory and the technology of the 1980s is the challenge facing Federal managers.

FEDERAL ADP MANAGEMENT ASSIGNED TO FEDERAL AGENCIES

The Brooks Act (Public Law 89-306) was passed in October 1965,

> "to provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies."

The responsibilities under the act are assigned to several agencies. The Office of Management and Budget (OMB) is responsible for fiscal and policy control. The General Services Administration (GSA) is responsible for developing, implementing, and monitoring Government-wide policy for acquiring, using, and managing ADP resources. The Department of Commerce, primarily through the National Bureau of Standards, is responsible for providing scientific and technological advisory services and for developing Federal Information Processing Standards. In addition, each Federal agency has certain responsibilities for managing its own ADP resources.

OMB Circular A-71 prescribes Government-wide responsibilities for the administration and management, including acquisition practices, of ADP activities. According to this circular, OMB

> "* * *will develop programs and issue instructions for achieving increased cost effectiveness through improved practices and techniques for the selection, acquisition and utilization of ADP equipment and resources."

Also, GSA was charged to

> "* * *develop and publish guidelines and criteria governing the replacement of equipment to avoid usage of such equipment beyond the point of economic advantage."

OBJECTIVES, SCOPE, AND METHODOLOGY

We undertook this review to determine if the Federal computer inventory is outmoded, and if so, how this situation arose, what types of costs and problems obsolescence 1/ has imposed, what should be done to resolve these problems, and how to prevent the situation from recurring.

The Federal inventory of general purpose computers showed that 12,645 processors were in use as of April 1979. Our area of interest was the 1,366 medium- and large-scale computers that had a central processing unit purchase price of more than $250,000 or a leasing price of over $10,000 per month. This represented 76 percent of the Federal inventory as of that date, based on purchase price.

1/For the purpose of this review, obsolescence is defined as declining in usefulness (useful being the economical, efficient, and effective processing of data) and, generally speaking, outmoded.

We discussed obsolescence problems with officials from Federal policy and operational agencies, computer manufacturers, and ADP associations. We visited or contacted over 20 typical Federal facilities processing large- or medium-scale scientific or general business applications. (See app. IV.) To illustrate the nature of the problem, at least one computer manufactured by each of four large-scale computer vendors was included in our individual installation studies. (See app. I.) The system configurations selected were representative of Federal computer centers nationwide.

We used the GSA Management Information System to identify computer installations with older equipment. Although this system is not complete and has other inaccuracies, it is the best information available on the Government's computer inventory and it was adequate for our purposes.

CHAPTER 2

THE USE OF OBSOLESCENT COMPUTERS INVOLVES UNNECESSARY COSTS AND PROBLEMS

The Federal inventory of medium- and large-scale computers is outmoded. Of the 1,366 such processors included in the April 1979 inventory, over half were technologically of the 1971 era or earlier. Almost a third of them were technologically 15 years old or older. Only 2 percent used the technology of 1975 or later. Unless action is taken to modernize the Government's computers, avoidable costs and unnecessary problems will continue.

Our work showed that the operational costs of obsolescent, Government-owned equipment can exceed the costs of using newer equipment even if the newer equipment is obtained on a short term lease basis. The maintenance, power, and cooling costs of outmoded, owned equipment were greater than the leasing, maintenance, power, and cooling costs of newer equipment. This alone can justify immediate replacement.

There are other, frequently unrecognized, costs of using older equipment--less efficient processing, increased personnel costs, greater floor space requirements, and the need to purchase commercial time-sharing when older, unreliable equipment breaks down. At the four installations we studied, we estimate that over $750,000 could be saved annually in maintenance, power, and cooling costs alone; other savings of over $600,000 appear readily achievable by switching to modern equipment.

In addition to higher costs, agencies using obsolescent equipment face many operational problems, including inflexibilities imposed by limitations of the older equipment and frequent unavailability of the system due to maintenance requirements and equipment failures.

In this chapter, we present information on the age of the inventory, the avoidable costs being incurred, and the operational problems being encountered. In chapter 3 we discuss the causes of the Federal computer obsolescence and the need to resolve the immediate problem and prevent its recurrence.

THE FEDERAL INVENTORY IS OUTMODED

The Federal inventory of medium-and large-scale computers is old and growing increasingly outmoded. As of April 1979, the 1,366 medium- and large-scale computers in the Federal

inventory had been acquired an average of 7 years earlier. 1/ The technology of the 978 processors from four major manufacturers was about 12 years old. Clearly this does not represent current computer technology. These 1,366 computers had a combined purchase value of $1.3 billion but are estimated to be worth just over one-fourth of their original value.

According to the General Services Administration, 12,645 computers were in the Federal inventory as of April 1979. We identified the 1,366 medium- and large-scale processors that represented 76 percent of the inventory based on purchase price. The 978 medium- and large-scale processors we examined from four major manufacturers' lines had an average acquisition date of August 1971. The charts on page 7 show the age of these 978 computers based on their technological age and their acquisition dates.

As clearly shown in the charts, these processors are very old from a technology standpoint. Most of them were first available in 1965. Technologically, 30 percent are 15 years old; another 24 percent are 9 years old. Less than 2 percent used technology that was introduced since 1975. Most of the 978 computers were acquired before 1973; about 75 percent were acquired between 1956 and 1974. Acquisitions dropped from a peak of 105 in 1973 to 55 in 1978. And despite the increased technology and growing awareness of computers, more were acquired in 1968 than in 1978.

The often quoted purchase price value of the Federal computer inventory is very misleading as an indicator of its present worth. The 1,366 medium- and large-scale computers in the April 1979 inventory had a combined purchase value of $1.3 billion; however, we estimate that the depreciated value of these computers was only a small portion of this amount on that date.

For example, a typical Federal computer still in use is a 1965 technology processor acquired in 1971 for about $450,000. A computer broker in the private sector estimated that this processor has no real value today, costs a great deal to operate and maintain, and is a high energy consumer. The broker estimated that it could be replaced by a current technology processor at considerable savings which would perform better. This was demonstrated in illustration D. (See pp. 49 - 52.)

1/Although our study did not include small computers, an OMB analysis shows their average age since acquisition to be 6.5 years.